

## **Molecular mechanism for protection against skin aging and hair growth by *Panaex ginseng***

**Tetsushi Furukawa**

*Tokyo Medical and Dental University, Medical research Institute*

The earliest evidence of humans' use of herb for healing dates back to the Neanderthal period. In the late 20th century, with concerns over the iatrogenic effects of conventional medicine and desire for more self-reliance, interest in natural health increased and use of herbal medicines again became popular. Among >20,000 herbal products that are currently on the market, ginseng root is one of the most popular herbs. The name "ginseng" originates in the "panacea (cure-all)", and it exhibits varieties of actions, including modulation of immune responses, antineoplastic effects, and cardio-protection. In addition, recent data show that ginseng has beneficial effects on skin-care and hair growth, and ginseng is widely used as a cosmetology medicine in Eastern Asia.

Steroid saponin "ginsenoside" is the major constituent of ginseng: more than 30 ginsenosides are included in ginseng. In this study, we examined effects of ginsenoside Re which exerts the strongest bioactivities. Ginsenoside Re exhibits estrogenic actions in a dose-dependent manner. Estrogen exhibits its actions by transactivation of various genes, referred as a classical genomic pathway and by membrane-delimited signaling referred as a non-genomic pathway. Ginsenoside Re produces nitric oxide via the non-genomic pathway of estrogen receptor without activation of genomic pathway. This is because ginsenoside Re has a bulky side-chain which interferes with the co-activator recruitment. Thus, ginsenoside Re is considered as non-genomic pathway specific ligand of estrogen receptor. Since estrogen is known to increase collagen content in the skin and proliferate hair follicle cells, the role of estrogenic actions of ginsenoside Re in skin-care and hair growth should be examined in the future study.